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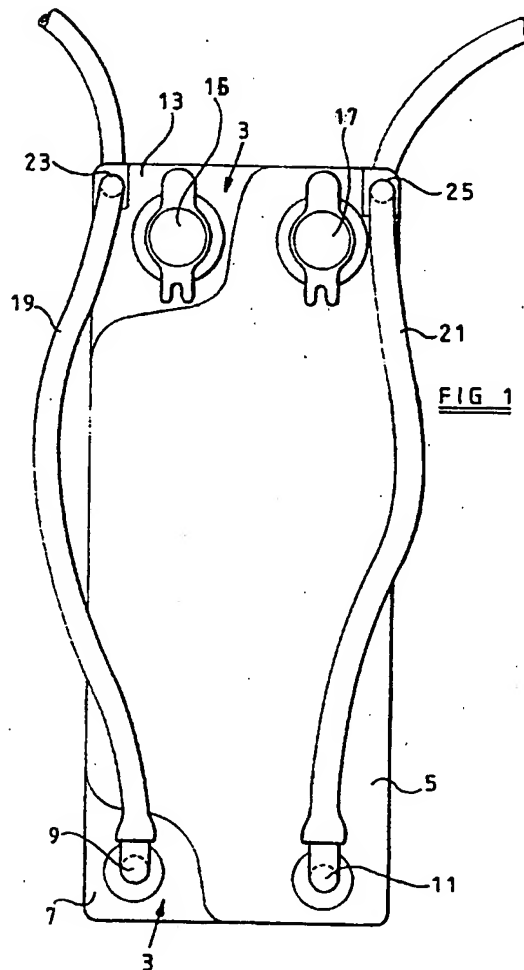
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(54) Flexible multi-compartment drinking bottle

(57) A liquid dispenser having at least two internal chambers comprises a first sheet (1, Fig. 2), second sheet (3) and a third sheet (5), each being made of liquid impermeable material. The sheets overlaid and are secured to each other so as to define first and second chambers. Means, such as closable inlets (15 and 17), are provided for the first and second chambers respectively. The third sheet is dimensioned such that a portion of the second sheet is not covered by the third sheet, the inlet 15 for the first chamber being provided in the second sheet in the portion thereof not covered by the third sheet. Both inlets can therefore be provided on the same side of the dispenser.

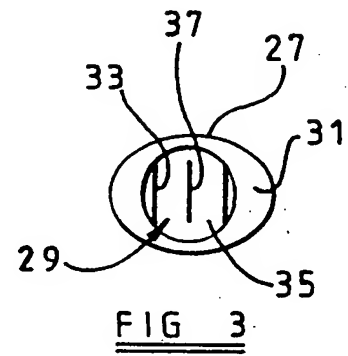
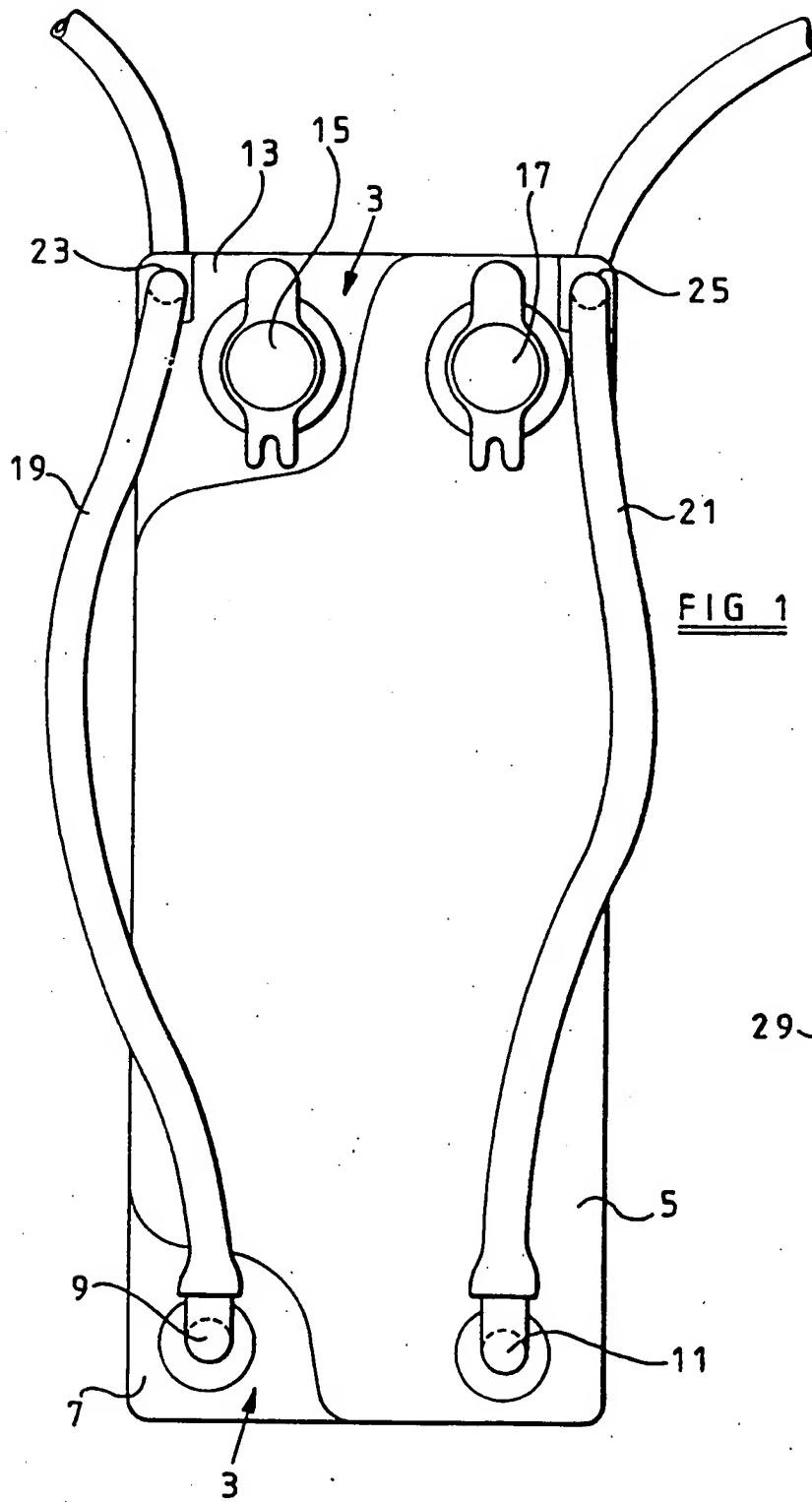
The dispenser is intended to be carried in a special bag on the back of an athlete (eg a cyclist) and a valve is disclosed which can be operated with the teeth. The arrangement of chambers is stated to provide improved balance and durability.



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.



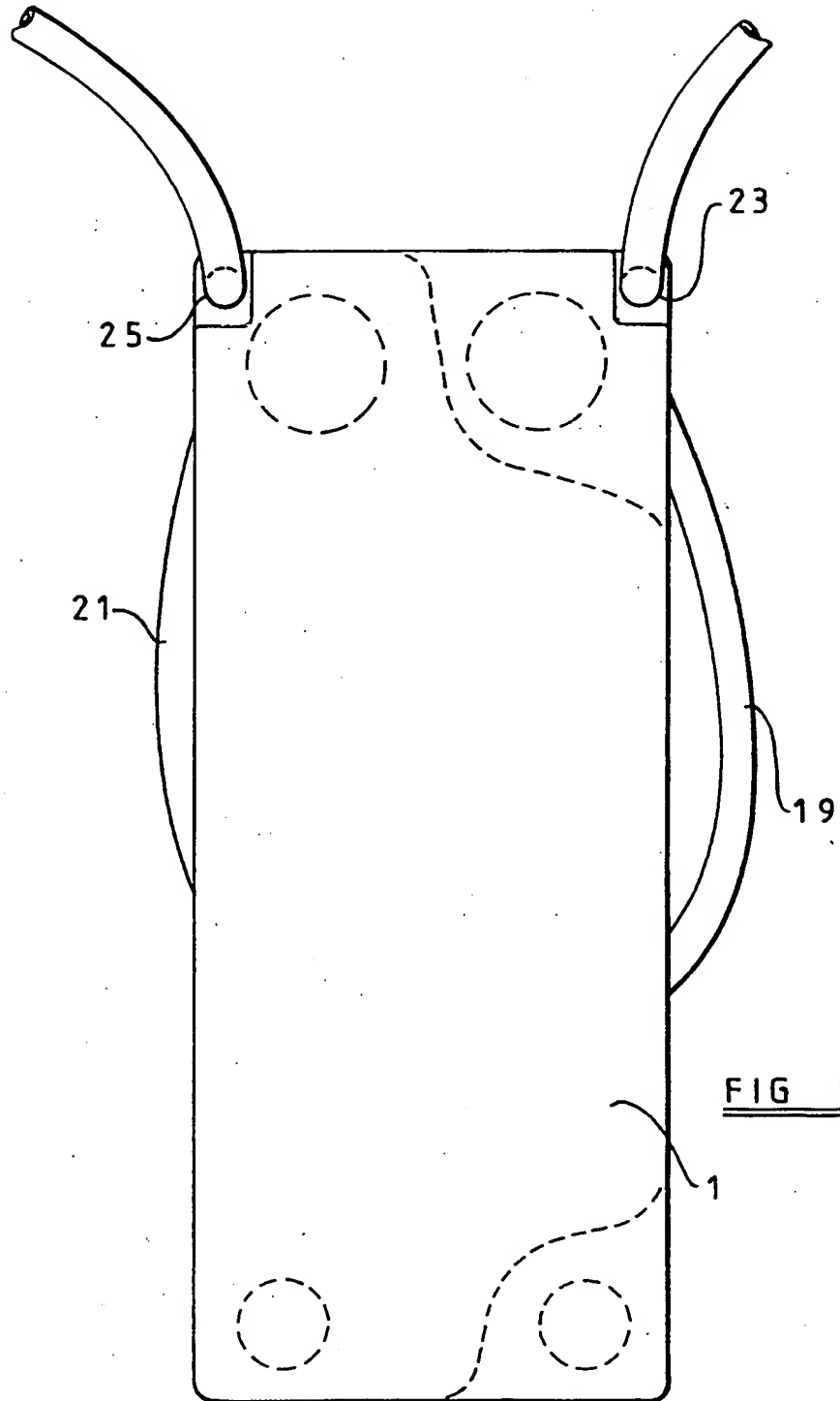


FIG 2

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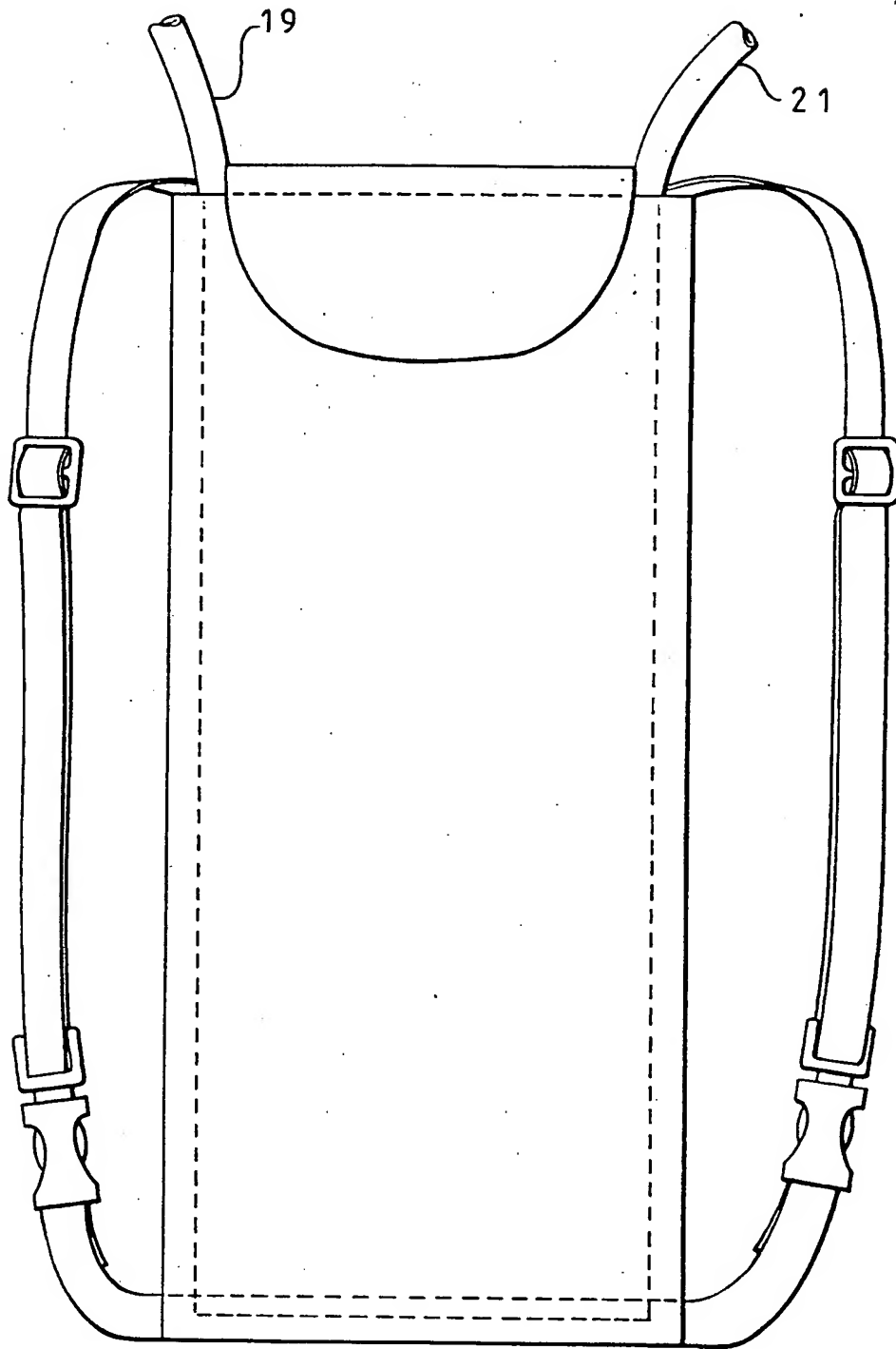


FIG 4

MULTIPLE CHAMBER LIQUID DISPENSER

The present invention relates to a multiple chamber liquid dispenser which can be used, for example by athletes, to provide liquid refreshment whilst undertaking an activity.

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Liquid dispensers for athletes are known for example from United States Patent No. 5,060,833, according to which liquid is stored in a single chamber. The disadvantage with a single chamber liquid dispenser is that it does not provide a choice of liquid refreshment for the athlete. Whilst specially formulated drinks for athletes may assist performance or recovery, there is a demand for pure water when a particularly refreshing drink is required.

10 It is therefore an object of the present invention to provide a multiple chamber liquid dispenser for example to provide an athlete with a choice of liquid refreshment.

15 According to the present invention there is provided a multiple chamber liquid dispenser comprising:

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a first sheet of liquid impermeable material;

a second sheet of liquid impermeable material overlying and secured to the first sheet so as to define therewith a first chamber;

25

a third sheet of liquid impermeable material overlying and secured to the second sheet so as to define therewith a second chamber;

5 means for permitting the passage of liquid into and/or out of the first chamber; and

means provided in the third sheet for permitting the passage of liquid into and/or out of the second chamber,

10

the arrangement being such that the third sheet is dimensioned such that a portion of the second sheet is not covered by the third sheet, the means for permitting the passage of liquid into and/or out of the first chamber being provided in the second sheet in the portion thereof not covered by the third sheet.

15

Further chambers may be provided by securing one or more additional sheets to the third sheet, the or each of the additional sheets being dimensioned such that a portion of the immediately underlying sheet is not covered, the means for permitting the passage of liquid into and/or out of the chamber behind the immediately underlying sheet being provided in the uncovered portion of the immediately underlying sheet.

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The first, second and third sheets may be substantially coextensive.

Separate means may be provided for permitting the passage of liquid into each of the first and second chambers and for permitting the passage of liquid out of each of the first and second chambers. To this end, the third sheet
5 may be dimensioned such that two portions of the second sheet are not covered by the third sheet, the means for permitting the passage of liquid into the first chamber being provided in the second sheet in one of the portions thereof not covered by the third sheet and the means for
10 permitting the passage of liquid out of the first chamber being provided in the second sheet in the other of the portions thereof not covered by the third sheet. The means for permitting liquid into the chambers may each comprise a closable member. The means for permitting liquid out of
15 the chambers may each be connected to a delivery tube for the liquid. Each delivery tube may pass through an aperture provided in the dispenser. A valve may be provided on the free end of each delivery tube. The valve may be made of a resilient material. The valve may
20 incorporate a chamber having two opposed relatively thin walled portions and two opposed relatively thick walled portions and a normally closed opening in the form of a slit provided in an end portion of the valve, the slit being openable when the relatively thin walled portions of
25 the valve are urged towards each other.

The first, second and third sheets may be made of a plastics material such as food grade polyvinyl chloride.

The sheets may be secured together by welding. The first second and third sheets may be treated to inhibit bacterial growth.

- 5 The liquid dispenser may be mounted within a carrying bag. The carrying bag may comprise a thermally insulating material such as polyurethane foam.

10 For a better understanding of the present invention and to show more clearly how it may be carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

15 Figure 1 is a front elevational view of one embodiment of a multiple chamber liquid dispenser according to the present invention, the illustrated dispenser having two chambers;

20 Figure 2 is a rear elevational view of the multiple chamber liquid dispenser shown in Figure 1;

25 Figure 3 is an end elevational view of one embodiment of a liquid delivery valve for use with the multiple chamber liquid dispenser shown in Figures 1 and 2; and

 Figure 4 is a front elevational view of one embodiment of a carrying bag adapted to receive the liquid dispenser as shown in Figures 1 and 2.

The multiple chamber liquid dispenser shown in Figures 1 and 2 comprises a rear or first sheet 1 of liquid impermeable material, such as food grade polyvinyl plastics material, an intermediate or second sheet 3 of liquid impermeable material overlying the rear sheet, and a front or third sheet 5 of liquid impermeable material overlying the intermediate sheet. The three sheets are generally coextensive and are secured together in a liquid-tight manner, for example by welding. If desired, the liquid impermeable material may be treated to inhibit bacterial growth within the dispenser.

Towards the lower end of the front sheet 5, the front sheet is formed with a cut-away portion at one side (the left-hand side as shown in Figure 1) thereof so as to reveal a portion 7 of the intermediate sheet 3. In order to prevent any leakage of liquid, the front sheet 5 is secured to the intermediate sheet 3 around the cut-away portion. Provided in the portion 7 is an outlet 9 for liquid stored in a chamber formed between the rear sheet 1 and the intermediate sheet 3. The outlet 9 may be welded, for example, to the intermediate sheet 3.

At the other side (the right-hand side as shown in Figure 1) of the lower end of the front sheet 5 an outlet 11 is provided for liquid stored in a chamber formed between the intermediate sheet 3 and the front sheet 5. The outlet 11 may be welded, for example, to the front sheet 5.

5 Towards the upper end of the front sheet 5, the front sheet is formed with a cut-away portion at one side (the left-hand side as shown in Figure 1) thereof so as to reveal a portion 13 of the intermediate sheet 3. In order to prevent any leakage of liquid, the front sheet 5 is secured to the intermediate sheet 3 around the cut-away portion. Provided in the portion 13 is a closable inlet 15 for filling the container formed between the rear sheet 1 and the intermediate sheet 3 with a hot or cold liquid and optionally with ice cubes or crushed ice. The inlet 13 may be welded, for example, to the intermediate sheet 3.

15 At the other side (the right-hand side as shown in Figure 1) of the upper end of the front sheet 5 a closable inlet 17 is provided for filling the chamber formed between the intermediate sheet 3 and the front sheet 5 with a hot or cold liquid and optionally with ice cubes or crushed ice. The inlet 17 may be welded, for example, to the front sheet 5.

20 The capacity of each of the chambers is conveniently of the order of 1 litre of liquid for each container, giving a total capacity of two litres. As will be appreciated, it is desirable to fill the two chambers with liquid at similar temperatures and not, for example, to fill one chamber with hot liquid and the other chamber with cold liquid.

Secured to each of the outlets 9 and 11 is a delivery tube 19 and 21, respectively. The delivery tube may be a push fit and/or glued onto the outlet and may be made of food grade polyvinyl plastics material. The delivery tube 19 passes through an aperture 23 provided through the rear sheet 1 and the intermediate sheet 3 at the top left-hand side of the liquid dispenser as shown in Figure 1 while the delivery tube 21 passes through an aperture 25 provided through the rear sheet 1, intermediate sheet 3 and front sheet 5 at the top right-hand side of the liquid dispenser as shown in Figure 1. The regions of the apertures 23 and 25 are isolated from the chambers formed between the sheets, for example by welding the sheets together. The apertures 23 and 25 may be provided with reinforcement (not shown) around the periphery thereof if desired.

Provided on the free end of each of the delivery tubes 19 and 21 is a liquid delivery valve 27 (not shown in Figures 1 and 2) which is normally closed but which can be opened by the user either by sucking or by biting the valve body. The liquid delivery valve 27 is shown in Figure 3 which is a view taken from the liquid entry end of the valve looking towards the liquid outlet end thereof. The valve is made of a resilient material such as a silicone rubber material and comprises a generally circular chamber 29 having an uneven wall thickness in the radial direction thereof so as to result in the outer surface of the chamber wall 31 defining a generally oval shape. This results in the

chamber wall having two opposed relatively thin walled portions and two opposed relatively thick walled portions. To assist retention of the liquid delivery valve 27 on the free end of the delivery tube 19, 21, the internal walls of the chamber 29 are formed with at least one, for example two, rib 33 on opposite sides thereof and which extends generally tangentially to the delivery tube 19, 21. The liquid outlet end of the valve 27 is closed by a generally flat end portion 35, the end portion being provided with a normally closed opening in the form of a slit 37 which extends between the regions of the two opposed relatively thin walled portions of the chamber wall 31.

In use, the two chambers are filled with a suitable liquid, or liquid/ice mixture, by way of the inlets 15 and 17 and thereafter liquid can be drawn out of a chosen chamber by the user by biting on the relatively thin walled portions of the chamber wall of the liquid delivery valve 27 so as to open the normally closed slit 37 and by sucking so as to draw liquid out of the chamber, along the delivery tube, through the valve and into the mouth of the user.

The liquid dispenser according to the present invention can be positioned at any suitable position relative to the user. For example, it can be placed in a conventional rucksack or it can be mounted on the frame of a bicycle. However, in many cases it will be preferable to carry the dispenser on the back of the user in a carrying bag

designed to accommodate the dispenser. Such a carrying bag is illustrated in Figure 4.

5 The carrying bag shown in Figure 4 comprises a thermal insulation material, such as an open cell polyurethane foam material, provided with an external covering and with an internal covering. The external covering and the internal covering may be of any suitable material, such as a nylon fabric laminated to the insulation material. The
10 insulation material enables the carrying bag to maintain hot liquids hot or cold liquids cold for an extended period of time, for example about 4 hours. The top of the carrying bag is open to permit the liquid dispenser to be inserted into the carrying bag and to be removed therefrom.
15 However, in order to retain the dispenser within the carrying bag when desired, a folding flap is provided at the upper end of the rear side of the carrying bag, which flap can be folded over to engage with fastening means provided on the front side of the carrying bag. Suitable
20 fastening means may comprise VELCRO material. The folding flap is dimensioned such that the width thereof permits one of the delivery tubes to pass between each end of the flap and the side of the carrying bag.

25 The carrying bag is retained on the back of the user by means of two straps. One strap is secured to each of the top corners of the carrying bag so as to extend generally in the longitudinal direction of the bag. The straps are

dimensioned so as to pass over the shoulders and chest of the user and to extend to the lower corners of the bag where the straps are secured in a direction generally transverse to the longitudinal direction of the bag. For durability, the straps at the lower end of the bag may be continuous and may be secured to the bag substantially across the entire width thereof. Each strap is provided with adjusting means for adjusting the length of the strap to suit the user and with a release mechanism to enable the bag to be readily removed by the user.

I have found that it is important to the user that the multiple chambers should be provided one behind the other, rather than side-by-side, and that the inlet and the outlet to each of the chambers should be positioned on the front of the liquid dispenser, that is on that face remote from the back of the user. Providing the multiple chambers one behind the other avoids any effect upon the balance of the user that might occur if the chambers were to be positioned side-by-side and if the distribution of liquid contents between the chambers should be uneven. Additionally, providing the multiple chambers one behind the other permits the liquid dispenser to collapse to a substantially flat configuration which would not be possible if the chambers were to be positioned side-by-side. This configuration additionally enhances the durability of the liquid dispenser. Providing the inlets and the outlets on the front side of the liquid dispenser, that is on that

side of the dispenser remote from the back of the user,
avoids any discomfort to the user that might arise if one
or more of the inlets and one or more of the outlets was to
be positioned on that face of the dispenser which, in use,
5 lies against the back of the user.

CLAIMS

1. A multiple chamber liquid dispenser comprising:

5 a first sheet of liquid impermeable material;

a second sheet of liquid impermeable material overlying and
secured to the first sheet so as to define therewith a
first chamber;

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a third sheet of liquid impermeable material overlying and
secured to the second sheet so as to define therewith a
second chamber;

15 means for permitting the passage of liquid into and/or out
of the first chamber; and

means provided in the third sheet for permitting the
passage of liquid into and/or out of the second chamber,

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the arrangement being such that the third sheet is
dimensioned such that a portion of the second sheet is not
covered by the third sheet, the means for permitting the
passage of liquid into and/or out of the first chamber
being provided in the second sheet in the portion thereof
25 not covered by the third sheet.

2. A liquid dispenser as claimed in claim 1 and including further chambers provided by securing one or more additional sheets to the third sheet, the or each of the additional sheets being dimensioned such that a portion of the immediately underlying sheet is not covered, the means for permitting the passage of liquid into and/or out of the chamber behind the immediately underlying sheet being provided in the uncovered portion of the immediately underlying sheet.

3. A liquid dispenser as claimed in claim 1 or 2, wherein the first, second and third sheets are substantially coextensive.

4. A liquid dispenser as claimed in claim 1, 2 or 3, wherein separate means is provided for permitting the passage of liquid into each of the first and second chambers and for permitting the passage of liquid out of each of the first and second chambers.

5. A liquid dispenser as claimed in claim 4, wherein the third sheet is dimensioned such that two portions of the second sheet are not covered by the third sheet, the means for permitting the passage of liquid into the first chamber being provided in the second sheet in one of the portions thereof not covered by the third sheet and the means for permitting the passage of liquid out of the first chamber

being provided in the second sheet in the other of the portions thereof not covered by the third sheet.

5 6. A liquid dispenser as claimed in any preceding claim, wherein the means for permitting liquid into the chambers each comprises a closable member.

10 7. A liquid dispenser as claimed in claim 6, wherein the means for permitting liquid out of the chambers is each connected to a delivery tube for the liquid.

15 8. A liquid dispenser as claimed in claim 7, wherein each delivery tube passes through an aperture provided in the dispenser.

9. A liquid dispenser as claimed in claim 7 or 8, wherein a valve is provided on the free end of each delivery tube.

20 10. A liquid dispenser as claimed in claim 9, wherein the valve is made of a resilient material.

25 11. A liquid dispenser as claimed in claim 10, wherein the valve incorporates a chamber having two opposed relatively thin walled portions and two opposed relatively thick walled portions and a normally closed opening in the form of a slit provided in an end portion of the valve, the slit being openable when the relatively thin walled portions of the valve are urged towards each other.

12. A liquid dispenser as claimed in any preceding claim, wherein the first, second and third sheets are made of a plastics material.

5 13. A liquid dispenser as claimed in claim 12, wherein the plastics material comprises food grade polyvinyl chloride.

14. A liquid dispenser as claimed in any preceding claim, wherein the sheets are secured together by welding.

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15. A liquid dispenser as claimed in any preceding claim, wherein the first second and third sheets are treated to inhibit bacterial growth.

15 16. A liquid dispenser as claimed in any preceding claim, wherein the liquid dispenser is mounted within a carrying bag.

17. A liquid dispenser as claimed in claim 16, wherein the
20 carrying bag comprise a thermally insulating material such as polyurethane foam.

18. A multiple chamber liquid dispenser substantially as
hereinbefore described with reference to, and as shown in,
25 the accompanying drawings.

Patents Act 1977 E: Examiner's report to the Comptroller under Section 17 -16- (The Search report)	Application number GB 9300135.2
Relevant Technical Fields (i) UK Cl (Ed.M) B8K (KAC,KFA,KFB,KFC) (ii) Int Cl (Ed.5) A45F 3/20; A61J 1/00; B65D 30/08, 30/22, 33/01 Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii)	Search Examiner A C HOWARD
	Date of completion of Search 23 FEBRUARY 1994
	Documents considered relevant following a search in respect of Claims :- 1-17

Categories of documents

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Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.	E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	US 5085349 (FAWCETT)	
A	US 5060833 (EDISON et al)	

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